

U.S. Pat. App. Ser. No. 10/668,472
Attorney Docket No. 10191/3280
RCE Reply to Final Office Action of February 2, 2007
(*in lieu of Reply Brief to Answer of July 17, 2008*)

REMARKS

Claims 15 to 22 are added, and therefore claims 1, 4 to 8 and 11 to 22 are pending in the above-referenced application and are submitted for the Examiner's reconsideration.

Claims 12 and 13 have been corrected to address minor grammatical errors. Approval and entry are respectfully requested.

With respect to paragraph four (4) of the Final Office Action, claim 14 was rejected under 35 U.S.C. § 112 because it is assertedly a duplicate of claim 1.

The rejection is traversed. Claim 14 depends from claim 13, which depends from claim 12, which depends from claim 11. As to claim 1, it recites that the "coating [is] structured as conductor paths", whereas claim 11 recites "a coating of a first metal structured as a conductor path". Also, as to claims 1 and 11, the equipping, seeding and depositing clauses as specifically recited differ from one another. Accordingly, claim 14 is not duplicative of claim 1. It is therefore respectfully requested that the rejection be withdrawn.

With respect to paragraph five (5), claims 1, 4 to 8 and 11 to 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Patent No. 6,406,939 ("Lin") in view of United States Published Patent Application No. 2003/0080392 ("Zuniga-Ortiz"), and United States Patent No. 6,372,539 ("Bayan") and Official Notice.

It is noted that as to the Official Notice, the Office cites as an example, column 8, lines 34 to 40, of the Lin reference to evidence that it is "well known in the art of printed circuit components to fire components to bond them to one another after formation of the components". However, this cited text only refers to melting conventional solder to fill the lower part of via holes, so that the solder 610 adheres to sidewalls of the via holes and input/output terminal pads 602 of an integrated circuit chip 601 to provide electrical and mechanical contacts.

As further regards the obviousness rejections, the Official Notice is respectfully traversed to the extent that it is maintained and it is requested that the Examiner provide specific evidence to establish those assertions and/or contentions that may be supported by that Official Notices under 37 C.F.R. § 1.104(d)(2) or otherwise. In particular, it is respectfully requested that the Examiner provide an affidavit and/or that the Examiner provide published information concerning these assertions. This is because the § 103 rejections are apparently being based on assertions that draw on facts within the personal

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knowledge of the Examiner, since no support was provided for these otherwise conclusory and unsupported assertions. (See also MPEP § 2144.03).

The “Background Information” section explains that in modern electronics, the trend is toward a reduction in component sizes and toward the integration of passive components, so that increasing integration density of integrated circuits can be met. One technology for achieving this goal is low-temperature co-fired ceramic (LTCC) which refers to a glass-ceramic mixture that, together with metallization pastes made, e.g., from Ag, AgPd, or Au, which is fired at a relatively low temperature that is below the melting point of the metals. (See specification, page 1, lines 6 to 13).

The presently claimed subject matter provides the benefit of a particularly simple and therefore economical method for producing a metal coating in the context of LTCC and ceramic substrates. Previously usual nickel and gold baths can be omitted, so that the process sequence is simpler and therefore more reliable. The coatings produced using the method according to the claimed subject matter have proven to be outstandingly suitable for producing bonding connections. (See specification, page 1, line 16 to 21).

In this regard, claim 1 relates to a method for producing a conductive layered coating on an insulating substrate, the method including equipping, in selected regions, at least one surface of an electrically insulating substrate with a coating of an electrically highly conductive first metal, the coating being structured as conductor paths, cleaning the at least one coated surface, seeding the coating with seeds of a second metal, depositing a layer including an alloy of the second metal onto the coating seeded with the seeds of the second metal, firing the substrate deposited with the layer of the second metal to form the conductive layered coating, and contacting a gold bonding wire to the conductive coating.

Claim 1 provides that the firing is performed at a temperature below the melting point of the first metal, the second metal and the alloy, and claim 1 further provides that the substrate includes an LTCC, the first metal includes silver, and the second metal includes palladium. Moreover, “firing” is a term of art that is consistent with the use of ceramics, as provided for by the LTCC substrate of claim 1. The other references do not disclose – and are not asserted to disclose – the feature in which the firing is performed at a temperature

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below the melting point of the first metal, the second metal and the alloy, as provided for in the context of claim 1.

In the Final Office Action of February 2, 2007, the Office acknowledges the fact that the prior art does not specifically teach an LTCC but asserts that it teaches a ceramic substrate at column 5, lines 1 to 2, of the Lin reference. The Office asserts that this would be inclusive of LTCC; however, LTCC refers to a glass-ceramic mixture that is fired at a relatively low temperature that is below the melting point of the metals being used. The Office then asserts that it would have been obvious to use silver as the first metal as taught by the Zuniga-Ortiz reference, and a gold bonding wire as taught by the Bayan reference. However, it is only because LTCC parts are fired at a low temperature that silver and gold conductors can be used. (See specification, page 1, line 16 to 21). Higher temperatures would require the use of refractory metals for circuit traces, which would result in high electrical resistance compared to noble metals. The other references do not disclose – and are not asserted to disclose – the feature in which the firing is performed at a temperature below the melting point of the first metal, the second metal and the alloy, as provided for in the context of claim 1.

Accordingly, it is respectfully submitted that Lin, Zuniga-Ortiz, Bayan, and the knowledge the Final Office Action asserts to be well known, whether taken alone or combined, do not disclose or suggest a method of producing a conductive coating on an electrically insulating LTCC substrate, in which selected regions of the surface of the substrate are equipped with a first metal which is seeded with a second metal and thereupon deposited with an alloy of the second metal and fired at a temperature below the melting points of the first metal, the second metal and the alloy, as provided for in the context of the claimed subject matter. Indeed, none of the references cited, or the knowledge asserted to be well known (which is not evidenced by the Lin reference as explained above), even refer to an LTCC substrate and the firing of such a substrate at a temperature below the melting points of metal layers applied thereon.

As explained above, col. 8, lines 34 to 40, of Lin only refers to applying a temperature to melt solder – which is wholly different than firing an LTCC substrate at a temperature below the melting point of the first metal, the second metal and the alloy, as provided for in the context of claim 1.

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Thus, it is respectfully submitted that Lin, Zuniga-Ortiz, Bayan, and the knowledge the Office Action asserts to be well known, whether taken alone or combined, do not disclose or suggest the features of connecting a gold bond wired to the conductive coating formed by the firing of the LTCC substrate at a temperature below the melting point of the first metal, the second metal and the alloy, as provided for in the context of claim 1. Indeed, none of the references cited, or the knowledge asserted to be well known (which is not conceded), contemplate or suggest such a configuration.

Accordingly, for at least these reasons, claim 1 is allowable.

Claims 4 to 8 depend from claim 1, and therefore are allowable for at least the same reasons as claim 1 as presented.

Claim 11 includes the *firing feature* like that of claim 1, and is therefore allowable for essentially the same reasons, as are its dependent claims 12 to 14.

As still further regards all of the obviousness rejections of the claims, it is respectfully submitted that a proper *prima facie* case has not been made in the present case for obviousness, since the Office Actions to date never made any findings, such as, for example, regarding in any way whatsoever what a person having ordinary skill in the art would have been at the time the claimed subject matter of the present application was made. (See In re Rouffet, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998) (the “factual predicates underlying” a *prima facie* “obviousness determination include the scope and content of the prior art, the differences between the prior art and the claimed invention, and the level of ordinary skill in the art”)). It is respectfully submitted that the proper test for showing obviousness is what the “combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art”, and that the Patent Office must provide particular findings in this regard — the evidence for which does not include “broad conclusory statements standing alone”. (See In re Kotzab, 55 U.S.P.Q. 2d 1313, 1317 (Fed. Cir. 2000) (citing *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1618 (Fed. Cir. 1999) (obviousness rejections reversed where no findings were made “concerning the identification of the relevant art”, the “level of ordinary skill in the art” or “the nature of the problem to be solved”))). It is respectfully submitted that there has been no such showings by the Office Actions to date or by the Advisory Action.

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In fact, the present lack of any of the required factual findings forces both Appellants and any Appeals Board to resort to unwarranted speculation to ascertain exactly what facts underly the present obviousness rejections. The law mandates that the allocation of the proof burdens requires that the Patent Office provide the factual basis for rejecting a patent application under 35 U.S.C. § 103. (See In re Piasecki, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984) (citing *In re Warner*, 379 F.2d 1011, 1016, 154 U.S.P.Q. 173, 177 (C.C.P.A. 1967))). In short, the Examiner bears the initial burden of presenting a proper prima facie unpatentability case — which has not been met in the present case. (See In re Oetiker, 977 F.2d 1443, 1445, 24, U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992)).

New claims 15 to 22 do not add any new matter and are supported by the present application. Claims 15 to 18 depend from claim 13 (which depends from claims 11 and 12), and are therefore allowable for the same reasons as their base claims. Claims 19 to 22 depend from claim 1, and are therefore allowable for the same reasons as their base claim.

Additionally, claim 15 specifically provides that *the low-temperature co-fired ceramic (LTCC) is a glass-ceramic mixture that, together with metallization pastes made from silver (Ag), silver-paladium (AgPd) or gold (Au), is fired at a relatively low temperature that is below the melting point of the metallization pastes*. The asserted general references to a ceramic simply do not disclose the LTCC of claims 1 or 11, or of claim 15. Accordingly, claim 15 is allowable for this further reason.

Additionally, claim 16 specifically provides that *a nickel bath is not used and a gold bath is not used*, and that *the low-temperature co-fired ceramic (LTCC) is a glass-ceramic mixture that, together with metallization pastes made from silver (Ag), silver-paladium (AgPd) or gold (Au), is fired at a relatively low temperature that is below the melting point of the metallization pastes*. The asserted general references to a ceramic simply do not disclose that *a nickel bath is not used and a gold bath is not used* nor the LTCC of claims 1 or 11, or of claim 16. Accordingly, claim 16 is allowable for this further reason.

Additionally, claim 17 – which depends from claim 16 -- specifically further provides that in the depositing of the layer of the second metal, palladium is deposited at a ratio of from 0.1 to 50% percent by weight of the alloy, in the depositing of palladium, the palladium is deposited in such a way that a concentration of greater than 20% percent by weight palladium in the alloy results, and the firing is performed at a temperature between 830 and

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870°C. Accordingly, claim 17 is allowable for these further reasons, and for the same reasons as its base claim (claim 16), since these features are nowhere disclosed by the applied references.

Additionally, claim 18 – which depends from claim 17 -- specifically further provides that the seeding and the depositing are performed according to an electroless procedure, and the firing is performed at a temperature of 850°C. Accordingly, claim 18 is allowable for these further reasons, and for the same reasons as its base claims (claims 16 and 17) , since these features are nowhere disclosed by the applied references.

Claims 19 to 22 recite features like those of claims 15 to 18, except that they depend from claim 1. Accordingly, claims 19 to 22 are allowable for the essentially the same further reasons as claims 15 to 18.

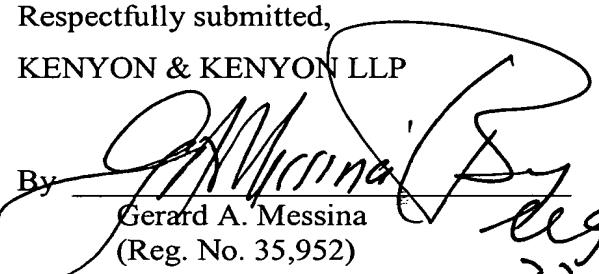
Accordingly, claims 1, 4 to 8 and 11 to 22 are allowable.

CONCLUSION

In view of all of the above, it is respectfully submitted that all of the presently pending claims are allowable. It is therefore respectfully requested that the objection and rejections be withdrawn. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is respectfully requested.

Dated: 9/17/2008

Respectfully submitted,
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